

FORM PTO-1390 (Modified) (REV 10-95)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER P-5808
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371			U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 09/555320)
INTERNATIONAL APPLICATION NO. PCI/FR98/02489	INTERNATIONAL FILING DATE November 20, 1998	PRIORITY DATE CLAIMED November 24, 1997	
TITLE OF INVENTION BASE STATION FOR MOBILE RADIOTELEPHONE			
APPLICANT(S) FOR DO/EO/US Paul VINCENT; Thierry LUCIDARME and Philippe DUPLESSIS			
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:			
<ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. 2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. 3. <input type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1). 4. <input checked="" type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date. 5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371 (c) (2)) <ol style="list-style-type: none"> a. <input checked="" type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> has been transmitted by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). 6. <input checked="" type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2)). 7. <input checked="" type="checkbox"/> A copy of the International Search Report (PCT/ISA/210). 8. <input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3)) <ol style="list-style-type: none"> a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> have been transmitted by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input type="checkbox"/> have not been made and will not be made. 9. <input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). 10. <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)). 11. <input checked="" type="checkbox"/> A copy of the International Preliminary Examination Report (PCT/IPEA/409). 12. <input type="checkbox"/> A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)). 			
Items 13 to 18 below concern document(s) or information included:			
<ol style="list-style-type: none"> 13. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98. 14. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. 15. <input checked="" type="checkbox"/> A FIRST preliminary amendment. A SECOND or SUBSEQUENT preliminary amendment. 16. <input type="checkbox"/> A substitute specification. 17. <input type="checkbox"/> A change of power of attorney and/or address letter. 18. <input checked="" type="checkbox"/> Certificate of Mailing by Express Mail 19. <input checked="" type="checkbox"/> Other items or information: 			
PCT Request (4 pgs.) 1 Sheet of Formal Drawings Verification of English Translation (1 pg.) Return Receipt Postcard			

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 1.53) 09/555320		INTERNATIONAL APPLICATION NO. PCT/FR98/02469		ATTORNEY'S DOCKET NUMBER P-5808	
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20. The following fees are submitted:				CALCULATIONS PTO USE ONLY	
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :					
<input checked="" type="checkbox"/>	Search Report has been prepared by the EPO or JPO	\$840.00			
<input type="checkbox"/>	International preliminary examination fee paid to USPTO (37 CFR 1.482)	\$720.00			
<input type="checkbox"/>	No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2))	\$790.00			
<input type="checkbox"/>	Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO	\$1,070.00			
<input type="checkbox"/>	International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4)	\$98.00			
ENTER APPROPRIATE BASIC FEE AMOUNT =				\$840.00	
Surcharge of \$130.00 for furnishing the oath or declaration later than months from the earliest claimed priority date (37 CFR 1.492 (e)). <input type="checkbox"/> 20 <input type="checkbox"/> 30				\$0.00	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	1 - 20 =	0	x \$18.00	\$0.00	
Independent claims	1 - 3 =	0	x \$78.00	\$0.00	
Multiple Dependent Claims (check if applicable). <input type="checkbox"/>				\$0.00	
TOTAL OF ABOVE CALCULATIONS =				\$840.00	
Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) (check if applicable). <input type="checkbox"/>				\$0.00	
SUBTOTAL =				\$840.00	
Processing fee of \$130.00 for furnishing the English translation later than months from the earliest claimed priority date (37 CFR 1.492 (f)). <input type="checkbox"/> 20 <input type="checkbox"/> 30 +				\$0.00	
TOTAL NATIONAL FEE =				\$840.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable). <input type="checkbox"/>				\$0.00	
TOTAL FEES ENCLOSED =				\$840.00	
				Amount to be refunded	\$
				charged	\$

<input checked="" type="checkbox"/>	A check in the amount of \$840.00	to cover the above fees is enclosed.
<input type="checkbox"/>	Please charge my Deposit Account No. _____ in the amount of _____	to cover the above fees.
	A duplicate copy of this sheet is enclosed.	
<input checked="" type="checkbox"/>	The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. 18-2284 A duplicate copy of this sheet is enclosed.	

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Michael L. Kenaga
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Chicago, Illinois, 60664-0807

(312) 368-4000

Michael L. Kenaga

SIGNATURE

Michael L. Kenaga

NAME

34,639

REGISTRATION NUMBER

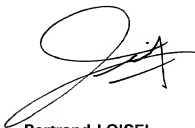
May 23, 2000

DATE

CERTIFICATION OF TRANSLATION

I, Bertrand LOISEL, of CABINET PLASSERAUD, 84, rue d'Amsterdam, 75440 PARIS CEDEX 09, FRANCE, do hereby declare that I am well acquainted with the French and English languages, and verify that the document attached is a true and correct literal English language translation of the text of International Patent Application no. PCT/FR98/02489.

Dated this 2nd day of May 2000.

A handwritten signature in black ink, consisting of a large, stylized 'B' followed by a series of loops and a final horizontal stroke.

Bertrand LOISEL

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of VINCENT, et al.)
)
U.S. patent application)
(U.S. National Phase of PCT/FR98/02489)
filed on November 20, 1998))
corr. to French applic. No.97 14716)

For : "BASE STATION FOR MOBILE RADIOTELEPHONE "

PRELIMINARY AMENDMENT

To Honorable Commissioner of Patents and Trademarks
Washington, D.C. 20231

S I R:

Prior to examination, please amend the above-identified application as follows:

IN THE SPECIFICATION:

Page 1, between lines 1 and 2, insert the heading
-- BACKGROUND OF THE INVENTION --.

Page 2, between lines 5 and 6, insert the heading
-- SUMMARY OF THE INVENTION --.

Page 3, delete lines 10-13.

Page 3, before line 14, insert the heading -- BRIEF DESCRIPTION OF THE DRAWINGS --.

Page 3, line 14, delete "which the" and insert - The --.

Page 3, between lines 15 and 16, insert -- DESCRIPTION OF PREFERRED EMBODIMENTS --.

IN THE ABSTRACT:

Please cancel the abstract as printed in the front page of the PCT publication, and insert the Abstract of the Disclosure as submitted in the appended sheet.

IN THE CLAIMS:

Please amend the sole claim of the PCT publication as follows:

-- 1 (Amended). A microcell base station for a multilayer radio communication cellular network, comprising a wire interface [(5)] for connection to a wire access network [(6)] and an air interface [(8)] for communicating by radio with mobile station in accordance with a time division multiple access operating mode, with signal frames each divided into a number N of successive timeslots, wherein telephone communications involving a

mobile station located within radio range of the equipment can be established through the wire network by means of the wire interface and the air interface, [and] wherein the air interface is arranged to transmit a radio signal in each timeslot of the frames on a beacon frequency, wherein the radio signal transmitted on the beacon frequency comprises a beacon signal carrying signalling information, in at least one timeslot as long as at most N-1 of the timeslots of the frame on the beacon frequency are occupied by communications with mobile stations, and wherein the air interface stops transmitting the beacon signal when the N timeslots on the beacon frequency are occupied by communications with mobile stations.--

Respectfully submitted,
PIPER MARBURY RUDNICK & WOLFE

Date:

May 23, 2000

By:

Michael L. Kenaga

Michael L. Kenaga
Reg. No. 34,639

PIPER MARBURY RUDNICK & WOLFE
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BASE STATION FOR MOBILE RADIOTELEPHONE

The present invention relates to a telephone equipment of the cellular radiotelephone base station type for a multilayer network.

5 The operator of a mobile telephone network distributes the base stations of the network across the territory to be covered, whereby the areas covered by the base stations define the cells. These base stations are linked to other mobile service infrastructures designed to
10 route calls and link up with the wire-line networks.

With the increased density of the cellular networks, the operators more and more often deploy so-called microcellular or multilayer networks, in which base stations of relatively weak power define small sized cells
15 referred to as microcells (the smallest cells are sometimes referred to as picocells; it is considered herein that such picocells are just a particular case of microcells), and base stations of longer range are further provided to form a superimposed layer of umbrella cells,
20 or macrocells. The microcells are used in areas having a strong density of local traffic.

Some of the radio resources are used by the base station in each cell for the broadcasting of beacon signals allowing its detection by the mobile stations
25 located within the cell.

When optimising a cellular radio telephone system, it is essential to limit as much as possible the interference between the different base stations, in order to take the greatest benefit from the frequency re-use
30 principle.

This requirement is somewhat in conflict with the intensive exploitation of the available radio resources. It causes limitations which are most significant when provision of a high communication density is looked for,
35 particularly in the case of microcells of a multilayer network.

An object of the present invention is to increase the radio communication capacity of a microcell, while limiting the interference between base stations in order to optimise the use of the available radio resources.

5 Accordingly, the invention proposes a microcell base station for a multilayer radio communication cellular network, comprising a wire interface for connection to a wire access network and an air interface for communicating by radio with mobile station in accordance with a time
10 division multiple access operating mode, with signal frames each divided into a number N of successive timeslots. Telephone communications involving a mobile station located within radio range of the equipment can be established through the wire network by means of the wire
15 interface and the air interface. The air interface is arranged to transmit a radio signal in each timeslot of the frames on a beacon frequency. This radio signal transmitted on the beacon frequency comprises a beacon signal carrying signalling information, in at least one
20 timeslot as long as at most N-1 of the timeslots of the frame on the beacon frequency are occupied by communications with mobile stations. The air interface stops transmitting the beacon signal when the N timeslots on the beacon frequency are occupied by communications
25 with mobile stations.

The communications involving a mobile station, during which the air interface stops transmitting the beacon signal (it uses the corresponding physical channel for the radio link with that mobile station), or those
30 which require the establishment with said mobile station of a radio link which saturates the radio resources allocated to the equipment. The base station, which can no longer accept any further communication, need not be detected anymore by the mobile stations which will rather
35 communicate through other base stations if necessary. In particular, the base station which stops transmitting its beacon signal may be backed up by that of an umbrella

cell. As soon as radio resources are released, the beacon signal is re-established and the station can resume serving other mobile stations.

5 The invention enables an increase in the number of communications which can take place at the same time in the microcell. Since that number is not very high (e.g. lower than 10), the additional channel made available by the interruption of the beacon signal is quite interesting.

10 Other features and advantages of the invention will become clear from the following description of an exemplary embodiment, which is not restrictive in any respect, and with reference to the appended drawings, of which the sole figure is a block diagram of an equipment
15 according to the invention.

 The figure illustrates a telephone equipment 4 forming a cellular radiotelephone base station, intended to be installed to define a microcell of a multilayer network.

20 The equipment 4 has a wire interface 5 to be connected to a wire-line telecommunication network 6.

 The wire-line telecommunication network 6 is the one which connects the base station to the other entities (BSC, MSC) of the cellular network which supervise the
25 base stations and provide the interface with the switched network. The interface 5 operates in a conventional manner using the protocols of the wire-line network 6.

 The equipment 4 also has an air interface 8 connected to the transmitting/receiving antenna 9. The
30 radio range of the equipment is typically of at most a few hundreds of metres.

 The equipment 4 illustrated in the figure has a conversion unit 10 between the interfaces 5 and 8. This unit 10 performs the various analogue-to-digital or
35 digital-to-analogue conversions, speech coding/decoding and shaping of the signal frames required to make the interfaces 5 and 8 communicate. A control unit 12

intercepts the signalling messages received on the interfaces 5 and 8 and controls these interfaces 5, 8 and the conversion unit 10 as appropriate.

In the specific example described here by way of illustration, the air interface 8 operates in accordance with the European GSM radiotelephone system used in numerous cellular networks.

In particular, the interface 8 forms a broadcast common channel (BCCH) at a certain beacon transmission frequency. This frequency, on which the station transmits permanently, may be assigned to the equipment by the cellular network operator.

On the BCCH channel, the base station 4 transmits a carrying signalling information. This beacon signal is transmitted with a duty ratio p . Since the GSM system is of the time division multiple access (TDMA) type, each TDMA frame being sub-divided into $N=8$ successive timeslots which may be assigned to different transmissions/receptions, the beacon signal may be transmitted during n timeslots over N ($1 \leq n \leq N$), which gives $p=n/N$.

We consider the case of a GSM microcell to which a single frequency is allocated, allowing up to $N=8$ TDMA channels. The first timeslot (for example) of each frame transports the beacon signal carrying the information relevant to the cell, and the other timeslots are occupied either by communications with mobile stations in the microcell or by stuffing (dummy) bits, so that the base station occupies the beacon frequency as required.

As long as the station supports up to $N-1=7$ communications with mobile units, the beacon signal is still transmitted other the first timeslot. To establish an eighth communication with a mobile station, the base station allocates the first timeslot on the beacon frequency for the downlink. Therefore, it stops transmitting the beacon signal, and replaces it by the

signal which it produces on the downlink for the communication, thereby saturating the radio resources which are allocated to it. As soon as one of the eight outstanding communications is terminated, the base station
5 has once again an available timeslot which it uses to retransmit the beacon signal. If that timeslot is not the first one, a channel transfer may be useful to release the first timeslot for the retransmission of the beacon signal.

10 Owing to this process, the communication capacity in the microcell is increased by 14%.

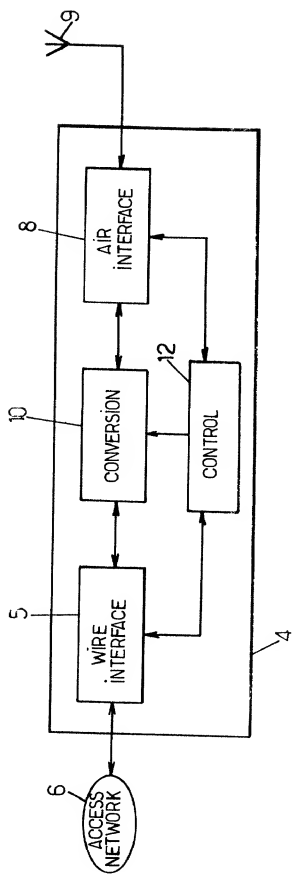
While the beacon signal is not being transmitted, the mobile stations located in the microcells can switch to another cell, in particular to an umbrella cell, and it
15 is not possible for other mobile stations to register with the microcell. As soon as the beacon signal is re-established, those stations can once again be served by the base station of the microcell.

C L A I M S

A microcell base station for a multilayer radio communication cellular network, comprising a wire interface (5) for connection to a wire access network (6) and an air interface (8) for communicating by radio with mobile station in accordance with a time division multiple access operating mode, with signal frames each divided into a number N of successive timeslots, wherein telephone communications involving a mobile station located within radio range of the equipment can be established through the wire network by means of the wire interface and the air interface, and wherein the air interface is arranged to transmit a radio signal in each timeslot of the frames on a beacon frequency, wherein the radio signal transmitted on the beacon frequency comprises a beacon signal carrying signalling information, in at least one timeslot as long as at most N-1 of the timeslots of the frame on the beacon frequency are occupied by communications with mobile stations, and wherein the air interface stops transmitting the beacon signal when the N timeslots on the beacon frequency are occupied by communications with mobile stations.

ABSTRACT OF THE DISCLOSURE

The base station is used in a microcell of a multilayer radio communication cellular network. It has a wire interface for connection to a wire access network and an air interface for communicating by radio with mobile station in accordance with a time division multiple access operating mode, with signal frames each divided into a number N of successive timeslots. Telephone communications involving a mobile station located within radio range of the equipment can be established through the wire network by means of the wire interface and the air interface. The air interface transmits a radio signal in each timeslot of the frames on a beacon frequency, that radio signal comprising a beacon signal carrying signalling information in at least one timeslot as long as at most $N-1$ of the timeslots of the frame on the beacon frequency are occupied by communications with mobile stations. The air interface stops transmitting the beacon signal when the N timeslots on the beacon frequency are occupied by communications with mobile stations.



Docket No.

Declaration and Power of Attorney For Patent Application

English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

BASE STATION FOR MOBILE RADIOTELEPHONE

the specification of which

(check one)

☒ is attached hereto.

☐ was filed on _____ as United States Application No. or PCT International

Application Number _____

and was amended on _____

(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

Priority Not Claimed

97 14716

(Number)

FRANCE

(Country)

24 November 1997

(Day/Month/Year Filed)

☐

(Number)

(Country)

(Day/Month/Year Filed)

☐

(Number)

(Country)

(Day/Month/Year Filed)

☐

I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional application(s) listed below:

(Application Serial No.)

(Filing Date)

(Application Serial No.)

(Filing Date)

(Application Serial No.)

(Filing Date)

I hereby claim the benefit under 35 U. S. C. Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. Section 112. I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, C. F. R., Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

PCT FR98/02489

(Application Serial No.)

20 November 1998

(Filing Date)

(Status)
(patented, pending, abandoned)

(Application Serial No.)

(Filing Date)

(Status)
(patented, pending, abandoned)

(Application Serial No.)

(Filing Date)

(Status)
(patented, pending, abandoned)


I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

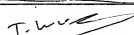
POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)

Michael L. Kenaga	<u>34,639</u>
William T. Rifkin	<u>26,501</u>
Mark I. Feldman	<u>26,880</u>
James P. Ryther	<u>20,424</u>
Mary Spalding Burns	<u>32,116</u>
R. Blake Johnston	<u>41,097</u>
Thomas W. Ryan	<u>43,072</u>
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Citizenship	French		
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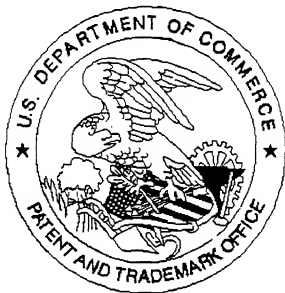
Full name of third inventor, if any	Philippe DUPLESSIS	
Third inventor's signature	<i>Philippe Duplessis</i>	Date
		June 10, 2000
Residence	92700 COLOMBES (France) FLX	
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Full name of fourth inventor, if any	
Fourth inventor's signature	Date
Residence	
Citizenship	
Post Office Address	

Full name of fifth inventor, if any	
Fifth inventor's signature	Date
Residence	
Citizenship	
Post Office Address	

Full name of sixth inventor, if any	
Sixth inventor's signature	Date
Residence	
Citizenship	
Post Office Address	

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Application deficiencies were found during scanning:

☐ Page(s) _____ of _____ were not present
for scanning. (Document title)

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for scanning. (Document title)

There is one sheet of drawing enclosed

☐ Scanned copy is best available.